

"Express Mail" mailing label number EK952353199US  
Date of Deposit October 18, 2001

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Case 8302M

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## **REDUCED FAT LIPID-BASED FILLINGS**

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### **CROSS REFERENCE TO RELATED APPLICATIONS**

This application claims the benefit of priority to U.S. Provisional Application Serial No. 60/242,609, filed October 23, 2000, which is herein incorporated by reference.

### **TECHNICAL FIELD**

The present invention relates to lipid-based fillings. More specifically, it relates to lipid-based fillings that have reduced fat and low moisture and are suitable for use in producing randomly packed food products.

### **BACKGROUND OF THE INVENTION**

Lipid-based fillings are used to produce a variety of food items. For instance, sandwich cookies and crackers are very popular food items in which lipid-based fillings are used. Typically, two identical biscuits (the shells or basecakes) contain a layer of sweet or savory fat lipid-based filling. There are many variations on this basic type. For example, the shells may be dissimilar in shape or color and one shell may have a hole or holes through which the lipid-based filling can be seen. The sandwich may be formed with wafer sheets and have multiple layers of lipid-based filling between the wafers. Lipid-based filling sandwich biscuits may be enrobed with a chocolate or other coating.

The fat component of sandwich cookie and cracker lipid-based fillings affects not only the eating character of the product, but other important aspects of process and quality. The sandwich lipid-based filling should be firm at ambient temperature to maintain

product shape and not squeeze out on handling or when bitten, yet have organoleptic properties allowing rapid melting in the mouth to release ingredients giving maximum flavor sensation without greasiness. The sandwich lipid-based filling should adhere to the biscuits so that the basecakes do not become misaligned or smeared, and the product does not fall apart (known as splitting or decapping) in production or after storage.

5 A number of fats, other ingredients, and processing conditions have been suggested for use in preparing filled biscuit sandwiches. Hydrogenated coconut and palm kernel oils are most used for lipid-based fillings (Manley, D. J. R., Technology of Biscuits, Crackers and Cookies, Ellis Horwood, Ltd, Chichester, 1983, pages 72 to 74). However, these

10 lauric fats exhibit cooling difficulties and have a tendency to supercool. As the supercooling is relieved, the mass sets up making extraction from a bulk store difficult unless the general temperature is considerably higher than 20°C (ibid.).

15 Controlled lipid-based filling biscuit cooling and good pressure following topping of the sandwich have been suggested to alleviate the problem (id. at 343 to 344). Either the lipid-based filling should be warmer at depositing or the biscuit shell should be warmer than the lipid-based filling. Where cooling is done, this should be minimal to effect a desired firmness of the lipid-based filling on the hottest day. Cooling air temperatures should be adjusted so that the biscuits are not taken to below the dew point so that condensation does not spoil biscuit shell quality, or adhesion at the biscuit-filling interface. Because of the high cost of operations and plant space for cooling tunnels, many plants do not cool their sandwich cookies and crackers either long enough or low enough (Smith, W. H., Biscuits, Crackers and Cookies, vol. 1, MFI, New York, 1972, pages 332 to 333).

20 U.S. Pat. No. 4,587,128 to Cummings teaches that a bonding layer be employed to make a snack food product, and that a pressure bearing member in the production equipment press the components into intimate contact with the bonding layer, but this complicates manufacture by adding another component and a pressure bearing member.

25 U.S. Pat. No. 4,865,859 to Porcello teaches a filling which is soft at room temperature yet is structurally stable during simulated adverse transport condition. The filling comprises a soybean oil-containing oleaginous composition mixed with sugar and preferably a flavoring.

30 U.S. Pat. No. 4,374,438 to Yost teaches quick-setting fillings suitable for sandwich biscuits. The fillings have a fat component enriched with triglycerides having both long, saturated C16 to C22 fatty acid residues and short C2 to C4 acid residues ("short/long triglycerides").

35 In Western countries, there is a general trend away from foods that are high in fat and calories, and decreasing dietary fats has been of special interest since fats have a significantly higher caloric density than either carbohydrates or protein. Hence, consumers have increasingly demanded food products with decreased caloric intake from fats.

40 Accordingly, it would be desirable to provide reduced-fat lipid-based fillings that are suitable for use in producing biscuit sandwiches that remain intact during processing and shipment such that the biscuit sandwiches experience minimal misalignment and

decapping, and such that the biscuit sandwiches are suitable for packing randomly in bags. It would be especially desirable to provide such a lipid-based filling that also has desirable organoleptical properties. It would also be desirable to provide a method for making such a sandwich biscuit without the use of special bonding agents or the need for specialized manufacturing equipment. Furthermore, it would be desirable to produce such a reduced-fat lipid-based filling that has a low moisture content, such that the lipid-based filling is shelf-stable.

### **SUMMARY OF THE INVENTION**

The present invention provides reduced-fat, low-moisture lipid-based fillings with desirable organoleptical properties. The lipid-based fillings can be used in a variety of food products, but are particularly suitable for use in producing randomly packed biscuit sandwiches.

The low moisture, reduced fat, lipid-based filling comprises: (a) at least about 20% non-digestible lipid; and (b) from about 0.5% to about 35% crystallizing lipid. The filling can additionally comprise other suitable optional ingredients.

The filling has a water activity of less than about 0.6 and has at least about 20% less digestible fat than a comparable full-fat lipid-based filling.

In one embodiment, the filling is a cheese filling. The low moisture, reduced fat, lipid-based cheese filling comprises:

- (a) from about 20% to about 60% non-digestible lipid;
- (b) from about 0.5% to about 35% crystallizing lipid;
- (c) from about 20% to about 75% dehydrated cheese powder; and
- (d) from about 0% to about 55% bulking agent.

Although not as preferred, in an alternate embodiment, the reduced fat, low moisture, lipid-based filling comprises:

- (a) at least 20% lipid, wherein said lipid comprises:
  - (1) from about 20% to about 100% non-digestible lipid; and
  - (2) from about 0% to about 80% digestible lipid; and
- (b) from about 0.5% to about 35% crystallizing lipid.

In another alternate embodiment, the filling is a cheese filling comprising:

- (a) at least 20% lipid, wherein said lipid comprises:
  - (1) from about 20% to about 100% non-digestible lipid; and
  - (2) from about 0% to about 80% digestible lipid;
- (b) from about 0.5% to about 35% crystallizing lipid;
- (c) from about 20% to about 75% dehydrated cheese powder; and
- (d) from about 0% to about 55% bulking agent.